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[SEVENTH SERIES.]

"..... per litora spargite muscum,
Nardes, et circum vitreos considite fontes;
Pollice virgineo teneros hic carpite flores;
Floribus et pictura, dicæ, replete, canistrum.
At vos, o Nymphæ Craterides, ite sub undas;
Ite, recurvato varinta corallia trunco
Vellite mûscosis e rupibus, et mihî conchas
Ferte. Deæ pelagi, et pingui conchylia succo."

N. Pæthæn Ginnettasi, Eccl. I.

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- 4.—*On a Tooth of Ceratodus and a Dinosaurian Claw from the Lower Jurassic of Victoria, Australia.* By A. SMITH WOODWARD, LL.D., F.R.S., of the British Museum.

[Plate I.]

THE Jurassic Vertebrate fauna of the Australian region is still almost unknown, some Ganoid fishes* and, perhaps, a few small Dinosaurian bones† being the only fossils representing it hitherto described. A tooth of *Ceratodus* and a Dinosaurian claw discovered by Mr. W. H. Ferguson in the Lower Jurassic cliffs of Cape Patterson on the south coast of Victoria are thus of special interest. I am indebted to Prof. J. W. Gregory, F.R.S., for the opportunity of studying these specimens.

* A. S. Woodward, "The Fossil Fishes of the Talbragar Beds," Mem. Geol. Surv. N. S. Wales, Palæont. no. 9 (1895); T. S. Hall, "A new Genus and a new Species of Fish from the Mesozoic Rocks of Victoria," Proc. Roy. Soc. Vict. n. s. vol. xii. (1900) art. xvi.

† H. G. Seeley, "On *Agrosaurus Macgillivrayi* (Seeley), a Saurischian Reptile from the N.E. Coast of Australia," Quart. Journ. Geol. Soc. vol. xlvii. (1891) pp. 164-165, with figs.

The tooth of *Ceratodus* (Pl. I. fig. 1) is firmly fixed to a recognizable piece of the splenial bone, and is therefore proved to belong to the left side of the lower jaw. It unfortunately lacks the foremost denticle, but clearly agrees with the majority of the Mesozoic teeth of *Ceratodus* in possessing only four denticles altogether. It is thick and robust, with the grinding-surface slightly convex, but wavy, and marked by a very prominent coarse network of ridges (fig. 1). It is specially remarkable for the long and narrow shape of its crown, which is bounded on the inner side by a nearly straight margin, not angulated opposite the second or third denticle. So far as can be determined from a fragment, the foremost denticle of the tooth appears to have been relatively large, while the others rapidly decrease in size backwards. The second and third denticles are sharply compressed to an acute outer edge, and are separated by deep notches at the outer margin (fig. 1 *a*), though not continued as conspicuous ridges on the crown. Their long axes are not oblique, but directed nearly at right angles to the inner margin. The fourth or hindmost denticle is comparatively blunt. Fine horizontal lines of growth are seen on the flattened inner (fig. 1 *b*) and outer faces of the tooth.

The specimen thus described differs from all the known Mesozoic teeth of *Ceratodus* in its narrowness, combined with the straightness of its inner margin and the direction of its second and third denticles. In these respects, it is interesting to observe, the tooth more nearly approaches that of the existing *Ceratodus* or *Neoceratodus* of Queensland (fig. 2), and its only striking difference from the latter consists in its having four denticles instead of six. The multiplication of the denticles has already been observed in the teeth of certain sharks as they are traced onwards in time*; the same phenomenon obviously occurs in *Ceratodus*.

There is, therefore, no doubt that the tooth from Cape Patterson represents a new species, which may be named *Ceratodus avus*. The fossil proves for the first time that the remarkable Dipnoan genus to which it belongs had already reached the Australian region so long ago as the early part of the Jurassic period. At that epoch *Ceratodus* was still living both in Europe † and in North America ‡, while it survived

* A. S. Woodward, "On the Palaeontology of the Selachian Genus *Notidanus*, Cuvier," *Geol. Mag.* [3] vol. iii. (1886) p. 257.

† *Ceratodus Phillipsi*, Agassiz, 'Rech. Poiss. Foss.' vol. iii. (1838) p. 135, pl. xix, fig. 17; A. S. Woodward, *Proc. Geol. Assoc.* vol. xi. (1890) p. 202, pl. iii, fig. 5.

‡ *Ceratodus Guentheri*, O. C. Marsh, *Amer. Journ. Sci.* [3] vol. xv. (1878) p. 76, woodc.

in the African and South American regions at least until the Cretaceous period*.

In the same rock as that from which the tooth of *Ceratodus* was obtained at Cape Patterson Mr. Ferguson found the terminal phalangeal bone shown in fig. 3. Among Jurassic fossils this specimen can only be compared with the claw of a carnivorous Dinosaur, and there is little doubt that it represents a genus more or less related to *Megalosaurus*†. The bone has decayed somewhat in the upper part of its proximal end, but is otherwise well preserved and displays its principal characters. The phalangeal is laterally compressed, so that its greatest transverse diameter is somewhat less than its original depth at the proximal end. The distal tapering half of the bone is only gently curved downwards, but at the same time bends slightly to the left side. The distal half of the lateral face is marked with the usual deep longitudinal groove connected with the fixing and nourishment of the horny claw which originally ensheathed the bone. The proximal end (fig. 3a) is divided, as usual, by a median vertical ridge into two facettes, which are nearly flat. For comparison with this specimen one of the finest known Megalosaurian claws from the English Wealden is shown in fig. 4. The latter is shorter and stouter than the former, and its deep lateral groove extends further backwards; but the general resemblance between the two fossils is very striking.

It is to be hoped that further diligent search may be made at Cape Patterson to recover the Vertebrate fauna indicated by these fragmentary fossils. The discovery of the terrestrial and freshwater life of the Australian region during the Jurassic period would supply a most important deficiency in palaeontological knowledge.

EXPLANATION OF PLATE I.

Fig. 1. *Ceratodus acus*, sp. n.; left splenial with lower tooth, from the upper, outer (a), and inner (b) aspects. — Lower Jurassic; Cape Patterson, Victoria, Australia. — *spl.*, splenial bone.

Fig. 2. *Ceratodus Forsteri*, Krefft; left lower tooth from the upper and outer (a) aspects. — Recent; Queensland.

Fig. 3. Ungual phalange of carnivorous Dinosaur; lateral and end (a) views. — Lower Jurassic; Cape Patterson, Victoria.

Fig. 4. Ungual phalange of a Megalosaurian; lateral and end (a) views, two thirds nat. size. — Wealden; Sussex. [Brit. Mus. no. R. 3176.]

Figs. 1-3 are of the natural size.

* *Ceratodus africanus*, E. Haug, 'Comptes Rendus,' vol. cxxxviii. (1904) p. 1529; from Djoua, Timassanine, Sahara. *Ceratodus Thuringi*, F. Ameghino, Public. Univ. La Plata, no. 2 (1904), p. 10, fig. 1; from Patagonia.

† R. Owen, 'Fossil Reptilia of the Wealden and Purbeck Formations,' pt. iii. (Mon. Palaeont. Soc. 1855 [1857]), p. 19, pl. 8.



2a



2b



1a



1b



1c

1d



3a



3b



4a



4b

d. inner vol. int. ex. sup.

1. 2. CERATODUS TEETH

3. 4. MEGALOSAURIAN CLAWS